

CLAIMS

We claim:

1. A patient carestation adapted to be used in connection with a patient, said patient carestation comprising a base, at least one environmental sensor adapted to sense information concerning the environment surrounding the patient and provide electronic signals indicative of that environment, at least two physiological sensors adapted to obtain information relating to physiological conditions of a patient undergoing treatment on the patient support and to provide electronic signals indicative of physiological conditions of the patient other than patient skin temperature, said patient care apparatus further having a signal processing means to receive signals from the at least one environmental sensor and the at least two physiological sensors, other than a patient skin temperature sensor, to integrate those signals into an integrated output stream of signals that convey information relating both to the environment surrounding the infant and physiological information of the patient.

2. The patient carestation as defined in claim 1 wherein a patient receives air through an airway and there is a therapeutic sensor that senses therapeutic information relating to conditions in the airway.

3. The patient carestation as defined in claim 2 wherein a patient receives air through said airway by means of a ventilator.

4. The patient carestation as defined in claim 3 wherein the therapeutic sensor senses information relating to the ventilation of a patient, including at least one of airway pressure, airway flow, tidal volume, and the concentration or partial pressure of gases in the airway.

5. The patient carestation as defined in claim 1 wherein the at least

two physiological sensors comprises sensors that sense at least two of weight, ECG, EEG, respiration, arterial blood pressure, non-invasive blood pressure, blood oxygenation, end tidal CO₂ concentration, patient skin temperature and electronic images.

6. The patient carestation as defined in claim 1 wherein the integrated output of signals is converted into a form visually recognizable by a user to obtain the information contained in the integrated output stream of signals.

7. The patient carestation as defined in claim 6 wherein the form visually recognizable by a user is an alpha-numeric readout.

8. The patient carestation as defined in claim 7 wherein said alpha-numeric readout provides a recommended course of action to a user based upon the information relating both to the performance of the apparatus and the physiological information of the patient.

9. The patient carestation as defined in claim 6 wherein the form visually recognizable by a user is an electronic image.

10. The patient carestation as defined in claim 1 wherein the integrated output stream of signals is provided to a smart alarm.

11. The patient carestation as defined in claim 1 wherein said signal processing mean includes a signal conditioning circuitry.

12. The patient carestation as defined in claim 1 wherein said integrated output stream of signals is transmitted to a remote location.

13. The patient carestation as defined in claim 12 wherein the integrated output stream of signals is transmitted to the remote location by wireless telemetry.

14. The patient carestation as defined in claim 1 wherein said patient carestation is in an infant care apparatus.

15. The patient carestation as defined in claim 1 wherein the apparatus further includes an imaging device to provide electronic signals representative of an image of a patient and such signals are inputted to the signal processing means.

16. The patient carestation as defined in claim 15 wherein the imaging apparatus is an X-ray machine that provides an electronic image of a patient.

17. A method of providing an integrated stream of data and information in a patient carestation relating to an operational parameter of the patient care apparatus and a physiological being of a patient, said method comprising the steps of:

providing at least one environmental sensor adapted to sense at least one parameter of the environmental conditions of a patient in the patient care apparatus and to provide an output signal indicative of that at least one environmental parameter;

providing at least two physiological sensors adapted to sense at least two physiological conditions of a patient, other than skin temperature, and to provide an output signal indicative of those physiological conditions;

integrating the output signals from the at least one environmental sensor and the at least two physiological sensors to obtain and provide a combined integrated stream of data and information indicative of both the environmental conditions and the physiological information of a patient.

18. The method as defined in claim 17 wherein the method further comprises the step of transmitting the combined integrated stream of data and information to a monitor to display the combined integrated stream of data and information in a visually perceptible form.

19. The method as defined in claim 18 wherein the step of transmitting

the combined integrated stream of data and information to a monitor comprises transmitting by a wireless transmission.

20. The method as defined in claim 19 wherein the step of providing at least two physiological sensors adapted to sense at least two physiological conditions of a patient, other than skin temperature, comprises providing physiological sensors adapted to sense at least two physiological conditions from the group comprised of weight, ECG, EEG, respiration, arterial blood pressure, non-invasive blood pressure and blood oxygenation, end tidal CO₂, patient skin temperature and x-ray data.

21. The method as defined in claim 17 wherein the step of providing at an environmental sensor comprises providing at least one environmental sensor adapted to sense a parameter from the group comprised of air temperature, oxygen concentration and humidity.

22. The method as defined in claim 17 wherein the method further comprises the step of providing a therapeutic input including information relating to a peripheral apparatus including a ventilator or an IV pump.

23. The method as defined in claim 22 wherein the step of providing a therapeutic input comprises an input having information relating to at least one of airway pressure, airway flow, tidal volume, partial pressure of gases in the airway and drip rate.

24. The method as defined in claim 17 wherein the method further comprises the step of providing patient information to a patient information input.

25. The method as defined in claim 17 wherein the method is used in an infant care apparatus.

26. A system for monitoring physiological conditions of an infant and environment conditions surrounding the infant undergoing care in an infant

warming apparatus, said system comprising:

at least one environmental sensor adapted to sense the environmental conditions of an infant in the infant warming apparatus and to send electronic signals indicative of an environmental parameter;

at least two physiological sensors adapted to sense differing physiological conditions of an infant in the infant warming apparatus and to send a separate stream of electronic signals indicative of each of two physiological conditions of an infant;

a signal processor adapted to receive the signals from the at least one environmental sensor and from the at least two physiological sensors, said signal processor adapted to integrate said signals into a integrated stream of electronic signals containing information relating to an environmental condition and at least two physiological conditions, and

a diagnostic apparatus adapted to receive the integrated stream of electronic signals and use those signals to diagnose conditions of a patient.

27. The system as defined in claim 26 wherein said at least one environmental sensor senses at least one parameter from the group comprised of air temperature, oxygen concentration and humidity.

28. The system as defined in claim 26 wherein said at least two physiological sensors sense a physiological condition of the infant from the group comprised of ECG, EEG, respiration, arterial blood pressure, non-invasive blood pressure, blood oxygenation, end tidal CO₂, patient skin temperature, x-ray data and weight.

29. The system as defined in claim 26 where the system further includes a patient information input to provide information to said signal processor relating to the patient.

30. The system as defined in claim 29 wherein the information relating to the patient includes at least one of patient history, current treatment, drugs administered, therapy administered, risk/history data, clinical findings and lab

results such as CBC, bilirubin, electrolytes, hematocrit, and prior treatment to the patient.

31. The system as defined in claim 26 where the system further includes a therapeutic information input to provide information to said signal processor relating to therapy administered to the patient by means of peripheral equipment including at least one of a ventilator and an IV pump.

32. The system as defined in claim 31 wherein the therapeutic information includes at least one of airway pressure, airway flow, tidal volume, partial pressure of gases inhaled and drip rate.

33. The system as defined in claim 26 wherein said system includes a visual display and said integrated stream of electronic signals is transmitted to said visual display to provide a visual perception to a caregiver of the conditions sensed by the environmental and said physiological sensors.

34. The system as defined in claim 26 wherein said integrated stream of electronic signals from said signal processor are digital signals.

35. The system as defined in claim 26 wherein said signal processor includes an analog to digital converter.

36. The system as defined in claim 26 wherein said diagnostic apparatus includes a smart alarm that interprets said signals relating to at least one environmental condition and at least two physiological conditions to diagnose conditions of a patient.

37. The system as defined in claim 36 wherein said smart alarm provides a recommended course of action to a user based upon the information relating both to the performance of the apparatus and the physiological information of the patient.

38. A patient carestation for monitoring conditions of a patient under the care of a patient care apparatus, said carestation comprising:

at least one environmental sensor adapted to sense an environmental condition of a patient cared for by the patient care apparatus and to send electronic signals indicative of an environmental condition;

at least one physiological sensor adapted to sense a physiological condition of a patient cared for by the patient care apparatus and to send electronic signals indicative of a physiological condition of a patient;

at least one therapeutic sensor adapted to sense a therapy condition relating to the administration of care to a patient by a peripheral apparatus;

an input for receiving patient information relating to a patient in the form of electronic signals;

a signal processor adapted to receive electronic signals from the at least one environmental sensor, the at least one physiological sensor, the at least one therapeutic sensor and the electronic signals representative of patient information received by said input, said signal processor integrating said electronic signals into an integrated stream of electronic signals.

39. The patient carestation as defined in claim 38 wherein the carestation includes a diagnostic apparatus adapted to receive the integrated stream of electronic signals and use those electronic signals to diagnose conditions of a patient.

40. The patient carestation as defined in claim 38 wherein the carestation further includes a display to provide a visual display of data from one or more of the at least one environmental sensor, the at least one physiological sensor, the at least one therapeutic sensor and the patient information received by the input.

41. The patient carestation as defined in claim 38 wherein the input is adapted to receive patient information from a hospital central record storage facility.

42. The patient carestation as defined in claim 38 wherein the carestation includes a smart alarm that interprets signals received from the at least one environmental sensor, the at least one physiological sensor, the at least one therapeutic sensor and the patient information received by the input to diagnose conditions of a patient.

43. The patient carestation as defined in claim 38 wherein a patient receives air through an airway and the at least one therapeutic sensor senses therapeutic information relating to conditions in the airway.

44. The patient carestation as defined in claim 43 wherein a patient receives air through said airway by means of a ventilator.

45. The patient carestation as defined in claim 43 wherein the at least one therapeutic sensor senses information relating to the ventilation of a patient from the group comprising airway pressure, airway flow, tidal volume, and the concentration or partial pressure of gases in the airway.

46. The patient carestation as defined in claim 38 wherein the at least one environmental sensor senses at least one environmental condition from the group comprised of air temperature, oxygen concentration and humidity.

47. The patient carestation as defined in claim 38 wherein the at least one physiological sensor comprises at least one physiological sensor that senses at least one condition from the group comprising weight, ECG, EEG, respiration, arterial blood pressure, non-invasive blood pressure, blood oxygenation, end tidal CO₂ concentration, patient skin temperature and electronic images.